# Department of Computer Science & Engineering
# End Semester Examination (Online)
# Semester-V - Computer Networks -CSE3152
# Question Paper

**Exam Date:23/12/21** **Max. Marks: 50**

## Part A (30M)

1. Consider Host A wants to send a large file to Host B. The path from Host A to Host B has three links, of rates R1 = 500 kbps, R2 = 2 Mbps, and R3 = 1 Mbps. Assuming no other traffic in the network, and the file size is 5 million bytes, then how long will it take to transfer the file to Host B?(1M)

a) 70 seconds
b) 80 seconds
c) 60 seconds
d) 120 seconds

2. Consider Host A wants to send a large file to Host B. The path from Host A to Host B has three links, of rates R1 = 500 kbps, R2 = 2 Mbps, and R3 = 1 Mbps. Let us assume that the file size is 6 million bytes and the rate of R2 is reduced to 100 kbps, then compute how much time is needed to transfer the file to Host B.(1M)

a) 400 seconds
b) 480 seconds
c) 350 seconds
d) 650 seconds

3. Suppose two hosts are connected by a channel with a transmission rate of 1Gbps, which uses Stop-and-wait protocol to provide reliable data transfer. Assume a sender is sending a packet of size 8000 bits/packet including both header fields and data. If 20ms is the propagation delay taken, then calculate the sender utilization USender for this transmission.(1M)

a) 0.000299
b) 0.000189
c) 0.000317
d) 0.000199

4. _____is an example of Loss-tolerant network application, whereas _____ is an example of non-time sensitive application. (1M)

a) E-mail, Instant messaging
b) Interactive games, Instant messaging
c) Internet telephony, streaming audio
d) Interactive games, E-mail.

5.FTP uses _____ connection and sends its control information_____, while HTTP uses _____connection and is said to send its control information_____.(1M)

a) Separate data, Out-of-band, same, In-band.
b) Separate control, Out-of-band, same, In-band.
c) Separate control, In-band, same, Out-of-band.
d) Same, Out-of-band, Separate data,In-band.

6.In a particular DNS resource record(RR), if Type= NS, then Name and Value fields indicate,(1M)

a) Name=hostname, Value=hostname of Top-level domain DNS server.
b) Name=domain, Value=hostname of root DNS server.
c) Name=hostname, Value=hostname of authoritative DNS server.
d) Name=domain, Value=hostname of authoritative DNS server.

7.The four broad categories of services offered by the transport layer to applications are (1M)

a) Reliable data transfer, bandwidth, flow control and security.
b) Throughput, timing, congestion control and security.
c) Throughput, flow control, congestion control and security
d) Reliable data transfer, throughput, timing and security.

8.Beyond IP, UDP provides additional services such as _____(1M)

a) Routing and switching
b) Sending and receiving of packets
c) Multiplexing and demultiplexing
d) Demultiplexing and error checking

9.Which is the correct expression for the length of UDP datagram?(1M)

a) UDP length = UDP length – UDP header's length
b) UDP length = IP length – IP header's length
c) UDP length = IP length + IP header's length
d) UDP length = UDP length + UDP header's length

10.An endpoint of an inter-process communication flow across a computer network is called _____(1M)

a) socket
b) pipe
c) port
d) machine

11. The maximum window size for data transmission using the selective reject protocol with n-bit frame sequence numbers is:

a)2^n
b) 2^(n-1)
c)2^n – 1
d)2^(n-2)

**12.** Retransmission of packets must not be done when _____(1M)

a) Packet is lost
b) Packet is corrupted
c) Packet is needed
d) Packet is error-free

**13.** In Go-Back-N window, when the timer of the packet times out, several packets must be resent even some may have arrived safe. Whereas in Selective Repeat window, the sender resends _____(1M)

a) Packet which are not lost
b) Only those packets which are lost or corrupted
c) Packet from starting
d) All the packets

**14.** In the congestion avoidance algorithm, the size of the congestion window increases _____ until congestion is detected.(1M)

a) exponentially
b) additively
c) multiplicatively
d) suddenly

**15.** In a network, when the load is below the capacity of the network, the throughput _____(1M)

a) Decreases sharply
b) Declines proportionately with the load
c) Increases proportionately with the load
d) Increases sharply

16.A router uses the following routing table-

| Destination | Mask | Interface |
|---|---|---|
| 144.16.0.0 | 255.255.0.0 | eth0 |
| 144.16.64.0 | 255.255.224.0 | eth1 |
| 144.16.68.0 | 255.255.255.0 | eth2 |
| 144.16.68.64 | 255.255.255.224 | eth3 |

A packet bearing a destination address 144.16.68.117 arrives at the router. On which interface will it be forwarded?(1M)

A. eth0
B. eth1
C. eth3
D. eth2

17. If an Internet Service Provider (ISP) has the following chunk of CIDR-based IP addresses available with it:245.248.128.0/20 and the ISP wants to give half of this chunk of address to Organization A, and a quarter to Organization B, while retaining the remaining with itself. Then, which among the following is a valid allocation of addresses to A and B?(1M)

**(A)** 245.248.136.0/21 and 245.248.128.0/22

**(B)** 245.248.128.0/21 and 245.248.128.0/22

**(C)** 245.248.132.0/22 and 245.248.132.0/21

**(D)** 245.248.136.0/24 and 245.248.132.0/21

18. In the IPv4 addressing format, the number of networks allowed under Class C addresses is (1M)

(A) 2^14

(B) 2^7

(C) 2^21

(D) 2^24

19. Suppose computers A and B have IP addresses 10.105.1.113 and 10.105.1.91 respectively and they both use the same netmask N. Which of the values of N given below should not be used if A and B should belong to the same network?(1M)

(A) 255.255.255.0

(B) 255.255.255.128

(C) 255.255.255.192

(D) 255.255.255.224

20.Which of the following assertions is FALSE about the Internet Protocol (IP) ?(1M)

**(A)** It is possible for a computer to have multiple IP addresses

**(B)** IP packets from the same source to the same destination can take different routes in the network

**(C)** IP ensures that a packet is discarded if it is unable to reach its destination within a given number of hops

(D) The packet source cannot set the route of an outgoing packets; the route is determined only by the routing tables in the routers on the way.

21. Two computers C1 and C2 are configured as follows. C1 has IP address 203.197.2.53 and netmask 255.255.128.0. C2 has IP address 203.197.75.201 and netmask 255.255.192.0. which one of the following statements is true?(1M)
(A) C1 and C2 both assume they are on the same network
(B) C2 assumes C1 is on same network, but C1 assumes C2 is on a different network
(C) C1 assumes C2 is on same network, but C2 assumes C1 is on a different network
(D) C1 and C2 both assume they are on different networks.

22.What is the correct order of the operations of OSPF?(1M)
i – Hello packets
ii – Propagation of link-state information and building of routing tables
iii – Establishing adjacencies and synchronization of database

a) i-ii-iii
b) i-iii-ii
c) iii-ii-i
d) ii-i-iii

23.When a router cannot route a datagram or host cannot deliver a datagram, the datagram is discarded and the router or the host sends a _____ message back to the source host that initiated the datagram.(1M)
a) Destination unreachable
b) Source quench

c) Router error
d) Time exceeded

24.Suppose two IPv6 nodes want to interoperate using IPv6 datagrams, but they are connected to each other by intervening IPv4 routers. The best solution here is _____(1M)
a) Use dual-stack approach
b) Tunneling
c) No solution
d) Replace the system

25. Which of the following is not a characteristic of Virtual Circuit Network?(1M)
a) There are setup and teardown phases in addition to the data transfer phase
b) Resources can be allocated during setup phase or on demand
c) All packets follow the same path established during the connection
d) Virtual circuit network is implemented in application layer
26. In a hub collision domain is spread across _____ where as in switch it is spread across _____(1M)
A. all the ports , one port
B. Half of the ports, All the ports
C. one port , one port
D. all the ports, all the ports

27. If a switch receives a frame and the source MAC address is not in the MAC address table but the destination address and port is, what will the switch do with the frame?(1M)
A. Discard it and send an error message back to the originating host
B. Flood the network with the frame.
C. Add the source address and port to the MAC address table and forward the frame out the destination port
D. Add the destination to the MAC address table and then forward the frame

28. Suppose nodes P, Q, and R each attached to the same broadcast LAN (through their adapters). If Q sends thousands of IP datagrams to R with each encapsulating frame addressed to the MAC address of R, what is reaction of P's adapter for all the frames_____.(1M)

A. Process all the frames and pass IP datagrams in these frames to it's network layer.
B. Will not Process all the frames.
C. Process all the frames and will not pass IP datagrams in these frames to it's network layer.
D. First frame is processed and all the subsequent frames are not processed at all.

29. MAC address is flat therefore it is _____whereas, IP address is hierarchical therefore it is _____.(1M)
A. not portable , portable.
B. portable , portable
C. not portable , not portable
D. portable , not portable

30. The polling a taking-turn protocol is more efficient compared to random access protocols as it eliminates the _____ and _____.(1M)
A. collision, empty slots
B. token passing, token generation
C. collision detection , carrier sensing

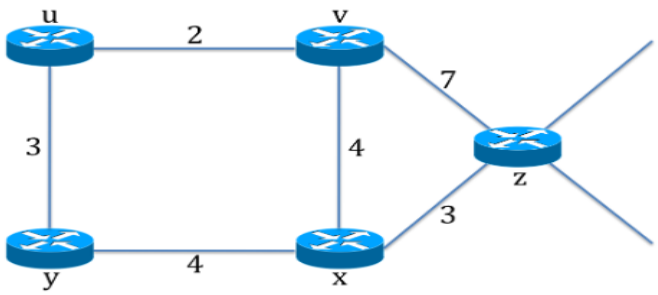
D. retransmission and token passing.

## Part B (20M)

**Q1A.**Distinguish between a timeout event and three-duplicate-ACKs event. Which one is a stronger sign of congestion in the network and why? 2M

**Q1B.**Differentiate between SMTP and HTTP, by listing atleast two similarities and one differences between the same. Also, specify the limitation of SMTP in this multimedia era?
3M

**Q1C.**Compare and contrast the distance vector and link state routing protocols. Consider the network shown below and assume that each node initially knows the costs to each of its neighbors. Consider the distance vector algorithm and show the distance table entries at node Z.
5M




**Q2A.** Explain how TCP keeps track of the segments being transmitted or received.
Suppose a TCP connection is transferring a file of 5,000 bytes. The first byte is umbered 10,001. What are the sequence numbers for each segment if data are sent in five segments, each carrying 1,000 bytes? 2M

**Q2B**Consider sending a 3000 byte datagram into a link that has a MTU of 500 bytes. Suppose the original datagram is stamped with the identification number 422. How many fragments are generated? What are their characteristics? 3M

**Q2C.**Justify the usage of a MAC address at datalink layer along with IP address at network layer in the TCP/IP protocol suite. Consider a LAN with 4 hosts A,B,C,D and a default router R1 implemented with a switch S1.Suppose Host A would like to send an IP datagram to Host B, and neither A's ARP cache contains B's MAC address nor does B's ARP cache contain A's MAC address. Further suppose that the switch S1's forwarding table contains entries for Host B and router R1 only. Give the actions That will Host A and switch S1 perform to send the ARP request message to B. Once Host B receives this ARP request message, it will send back to Host A an ARP response message. But will it send an ARP query message to ask for A's MAC address? Why? What will switch S1 do once it receives an ARP response message from HostB?
5M
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